barrier dune ridges for the past six decades have changed the dynamics of all barrier islands, but particularly simple inlet- and overwash-dominated barriers (Fig. 16). The constructed barrier dune ridges have acted as walls that have prevented most overwash associated with average storm events. This has resulted in little sediment delivery to the barrier island's sound side. Lack of overwash sand has led directly to increased rates of sound-side shoreline erosion (Riggs and Ames, 2003).

The constructed barrier dune ridges, in concert with a natural sand deficiency and net ocean shoreline recession related to sea-level rise, cause the ocean beach profile to steepen, resulting in even higher rates of shoreline recession. The constructed dune ridges, built to protect the islands have, ironically, contributed to their erosion.

Beach and Inlet Management

Shoreline Hardening

Most North Carolinians have supported the concept of maintaining natural beaches and historically have preferred beach nourishment and relocation as the main measures for combating ocean-front and inlet shoreline erosion. North Carolina law dictates that trading concrete, steel, rock, and debris for the natural sand beach is not an acceptable erosion control measure. Further, hardened structures on beaches and inlets inevitably cause increased erosion and ultimate loss of the beach (Fig. 17).

However, as sea level rises and shorelines recede, there is ever increasing pressure for implementing more permanent shoreline stabilization structures along the North Carolina ocean beaches and inlets. Along the 325 miles of ocean and inlet shoreline in North Carolina, there are eleven

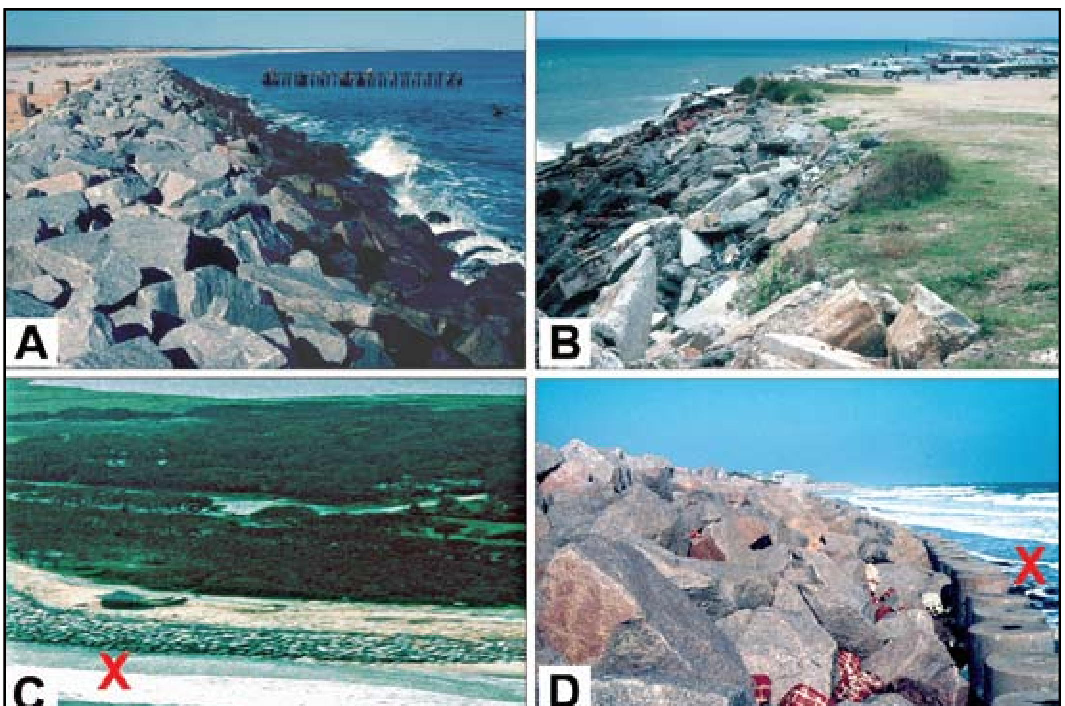

FIGURE 17. *Construction of rock-revetments and bulkheads along sandy beaches inevitably results in loss of the beach in front of the hardened structures. Panel A is the rock structure at Carolina Beach in 1977 and Panel B is a rubble revetment at Fort Fisher. Both structures were in place before the no hardening rule of 1985. Panels C and D are of the rock revetment built about 1997, with a variance from the NC Coastal Resources Commission, to protect the eroding Fort Fisher. The red X is the same location on panels C and D. All photographs are by S. Riggs.*